

IN THE CLAIMS:

Please enter the following claim set:

1-26. (canceled)

B1 1 ~~27~~ (currently amended): A loadlock as in claim ~~22~~, further comprising:
a chamber body;
a first support structure in said chamber body adapted to support one unprocessed substrate;
a second support structure in said chamber body adapted to support one processed substrate;
said first support structure being disposed above said second support structure;
an elevator to control the vertical position of said first support structure and said second support structure;
a first aperture to permit insertion of an unprocessed substrate into said loadlock and removal of a processed substrate from said loadlock;
a second aperture to permit removal of an unprocessed substrate from said loadlock and insertion of a processed substrate into said loadlock;
a cooling plate including a surface adapted to support a processed substrate thereon;
a middle plate between said first support structure and said second support structure;
and
a heating device located above said first support.

2 ~~28~~ (original) A loadlock as in claim ~~27~~, wherein said cooling plate includes at least one structure extending therefrom and said middle plate includes at least one opening sized to accommodate said at least one structure extending from said cooling plate.

3 ~~29~~ (original) A loadlock as in claim ~~27~~, wherein said first support structure is connected to said middle plate.

4 ~~30~~ (original) A loadlock as in claim ~~27~~, wherein said middle plate includes a cooling layer and an insulation layer.

31. (canceled)

5 ~~32.~~ (currently amended) A loadlock as in claim 22 ~~20~~, wherein said first support structure comprises a plurality of pins and said second support structure comprises a plurality of pins.

33-38. (canceled)

6 ~~39.~~ (currently amended) A substrate processing system as in claim 38, wherein said loadlock further comprises comprising:

at least one processing chamber;

a transfer chamber connected to said at least one processing chamber; and

a loadlock connected to said transfer chamber, said loadlock comprising:

a single substrate upper support and a single substrate lower support;

a transfer aperture to transfer a single substrate between said transfer chamber

and said loadlock;

an elevator to raise and lower said single substrate upper support and said single substrate lower support;

a cooling plate disposed in said loadlock and positioned to accept a single substrate from said single substrate lower support;

a middle plate disposed above said cooling plate and below said heating element;

a load/unload aperture through which an unprocessed substrate may be loaded into said loadlock and through which a processed substrate may be unloaded from said loadlock;

a transfer aperture through which an unprocessed substrate may be delivered from said loadlock to said transfer chamber and through which a processed substrate may be delivered from said transfer chamber to said loadlock; and

a heating element disposed above said single substrate upper support.

7 ~~40.~~ (original) A substrate processing system as in claim 39, wherein said single substrate upper support is connected to said middle plate.

~~8~~ ~~41~~ (original) A substrate processing system as in claim ~~40~~, further comprising a gas inlet to supply a gas to said loadlock.

~~9~~ ~~42~~ (original) A substrate processing system as in claim ~~41~~, wherein said loadlock includes a top surface, said gas inlet being located along said top surface of said loadlock.

43-105. (canceled)

~~11~~ ~~106~~ (previously added) A loadlock for processing display substrates, comprising:
a chamber body defining a first aperture on a first side surface and a second aperture on a second side surface;

an upper support adapted to support a display substrate;

a middle plate connected to said upper support;

a lower support adapted to support a display substrate;

a lower plate connected to said lower support;

a single cooling plate positioned in said chamber, said single cooling plate being positioned between said middle plate and said lower plate;

a heating element disposed above said upper support; and

an upper plate positioned above said upper support;

wherein said upper plate, middle plate, and lower plate are connected to each other so that said upper plate, middle plate, and lower plate can move together in a vertical direction independent of said cooling plate.

~~12~~ ~~107~~ (previously added) A loadlock as in claim ~~106~~, further comprising a processed display substrate on said lower support and an unprocessed display substrate on said upper support at the same time.

~~13~~ ~~108~~ (currently amended) A loadlock as in claim ~~106~~, wherein said display substrates comprises comprise glass.

~~14~~ ~~109~~ (previously added) A loadlock as in claim ~~106~~, wherein said upper support and said lower support are sized to accept a glass substrate having a rectangular shape including a length of at least 650 mm and a width of at least 830 mm.

~~15~~ ~~110~~ (previously added) A loadlock as in claim ~~106~~, further comprising a gas inlet and a gas supply, said gas supply including helium gas.

~~16~~ ~~111~~ (previously added) A loadlock as in claim ~~110~~, further comprising a filter disposed adjacent to said gas inlet.

~~17~~ ~~112~~ (previously added) A loadlock as in claim ~~106~~, further comprising an elevator coupled to said lower plate and adapted to move said lower plate, said middle plate and said upper plate in a vertical direction, wherein said cooling plate is stationary when said lower plate, said middle plate and said upper plate are moved by said elevator.

~~18~~ ~~113~~ (previously added) A loadlock as in claim ~~106~~, wherein said middle plate includes a cooling layer and an insulation layer.

~~19~~ ~~114~~ (previously added) A loadlock system comprising:
a loadlock chamber;
a lower plate having a plurality of supports extending therefrom, said supports adapted to accept a single substrate;
a cooling plate disposed in said chamber, said cooling plate positioned to accept a single substrate from said support structure, said cooling plate including a plurality of apertures therethrough that are sized to accept said supports;
said lower plate being spaced apart from and below said cooling plate; and
said lower plate and plurality of supports being adapted to move in a vertical direction independent of said cooling plate.

~~20~~ ~~115~~ (previously added) A loadlock system as in claim ~~114~~, further comprising a middle plate having a plurality of supports extending therefrom, said supports adapted to accept a single substrate, said middle plate positioned above said cooling plate.

~~21~~ ~~116~~ (previously added) A loadlock system as in claim ~~115~~, wherein said middle plate and said lower plate are connected to each other and adapted to move together in a vertical direction.

~~221~~ 117. (previously added) A loadlock system as in claim ~~116~~²¹, further comprising an upper plate positioned above said middle plate and coupled to said middle plate and said lower plate so that said upper plate, middle plate and lower plate move together in a vertical direction.

~~223~~ 118. (previously added) A loadlock system as in claim ~~115~~²⁰, further comprising a heating element positioned above said middle plate.

~~244~~ 119. (currently amended) A loadlock system as in claim ~~114~~¹¹⁹, further comprising an elevator connected to said lower plate and adapted to change a vertical position of said lower plate and plurality of supports while at the same time said cooling plate remains in a fixed vertical position, wherein said elevator is positioned below said lower plate.

~~25~~ 120. (currently amended) A loadlock system comprising:
a loadlock chamber;
a lower support structure adapted to support a substrate in said loadlock chamber;
an upper support structure adapted to support a substrate in said loadlock chamber;
a cooling plate having an upper surface positioned between said lower support structure and upper support structure in said loadlock chamber when a substrate is positioned on said cooling plate upper surface, ~~said cooling plate adapted to support a substrate~~; and
an elevator positioned below said lower support structure and coupled to said lower support structure and said upper support structure, said elevator adapted to change a vertical position of said lower support structure and said upper support structure while at the same time said cooling plate remains in a fixed vertical position.

~~26~~ 121. (previously added) A loadlock system as in claim ~~120~~²⁵, further comprising a heating element positioned above said upper support in said loadlock chamber.

~~27~~ 122. (currently amended) A loadlock system as in claim ~~121~~²⁶⁰, further comprising a first aperture positioned on a first side of said loadlock chamber and a second aperture positioned on a second side of said loadlock chamber, wherein said upper support structure, said lower support structure, and said cooling plate are positioned between said first aperture and said second aperture.

~~25~~ 123. (previously added) A loadlock system as in claim 120, further comprising a gas inlet adapted to supply a gas to said loadlock chamber.

~~26~~ 124. (previously added) A loadlock system as in claim 123, wherein a gas comprising helium is supplied to said loadlock chamber.

~~27~~ 125. (previously added) A loadlock system as in claim 123, wherein a gas comprising helium and nitrogen is supplied to said loadlock chamber.

~~31~~ 126. (currently amended) A loadlock as in claim 125, wherein said gas supplied to said loadlock chamber has a nitrogen partial pressure of 754-759 torr and a helium partial pressure of 1-6 torr.

~~32~~ 127. (previously added) A loadlock system as in claim 123, wherein said loadlock chamber includes a top surface, said gas inlet being located along said top surface of said loadlock chamber.

~~33~~ 128. (currently amended) A processing system comprising:
at least one processing chamber;
a transfer chamber connected to said at least one processing chamber; and
a loadlock connected to said transfer chamber, said loadlock comprising:
a loadlock chamber;
a lower support structure adapted to support a substrate in said loadlock chamber;
an upper support structure adapted to support a substrate in said loadlock chamber;
a cooling plate having an upper surface positioned between said lower support structure and upper support structure in said loadlock chamber when a substrate is positioned on said cooling plate upper surface, ~~said cooling plate adapted to support a substrate~~; and
an elevator positioned below said lower support structure and coupled to aid lower support structure and said upper support structure, said elevator adapted to change a vertical position of said lower support structure and said

upper support structure while at the same time said cooling plate remains in a fixed vertical position.

~~34~~ 429. (previously added) A processing system as in claim ~~128~~³³, wherein said at least one processing chamber comprises at least one chamber selected from the group consisting of a physical vapor deposition chamber, a chemical vapor deposition chamber, an etching chamber, and a heating chamber.

~~35~~ 430. (previously added) A processing system as in claim ~~128~~³³, further comprising an external substrate supply station including:

a first robot to deliver substrates to said loadlock and pick up substrates from said loadlock;

at least one unprocessed substrate cassette to supply unprocessed substrates to said loadlock; and

at least one processed substrate cassette to accept processed substrates from said loadlock.

~~36~~ 431. (previously added) A processing system as in claim ~~130~~³⁵, further comprising a second robot to transfer a substrate between said loadlock and said transfer chamber.

~~37~~ 132. (canceled)

~~37~~ 433. (currently amended) A ~~substrate~~ processing system as in claim 432 ~~128~~³², the loadlock further comprising a heating element disposed above said ~~single-substrate~~ upper support structure.

~~38~~ 434. (currently amended) A ~~substrate~~ processing system as in claim 432 ~~128~~³³, the loadlock further comprising a cooling gas comprising helium and nitrogen.

~~39~~ 435. (currently amended) A substrate processing system including a loadlock and a transfer chamber, comprising:

first support means for supporting an unprocessed substrate in the loadlock;

means for heating the unprocessed substrate on the first support in the loadlock;

second support means for supporting a processed substrate in the loadlock, the second support means being located below the first support means;

coupling means for coupling the first support means and the second support means together, so that the first support means and the second support means move in unison;

means for cooling the processed substrate in the loadlock, said means for cooling including a plate;

means for changing the position of the first support and the second support at the same time while maintaining the plate at a fixed position;

wherein the means for heating and the means for cooling are disposed in the loadlock at the same time;

wherein the plate of the means for cooling the processed substrate includes a plurality of apertures therein; and

wherein the second support means includes a plurality of support pins extending through the apertures when the plurality of support pins are supporting a processed substrate.

41 ~~136~~ (new) A loadlock comprising:

a chamber body;

a first support structure in said chamber body adapted to support a substrate;

a second support structure in said chamber body adapted to support a substrate;

said first support structure being disposed above said second support structure;

an elevator to control a position of said first support structure and said second support structure;

a cooling plate including a surface adapted to support a processed substrate thereon;

and

a heating device located above said first support;

wherein said second support structure extends through said cooling plate when said second support structure is positioned to support a substrate.

42 ~~137~~ (new) A loadlock as in claim ~~136~~, further comprising a first aperture adapted to permit insertion of an unprocessed substrate into said loadlock and removal of a processed substrate from said loadlock; and a second aperture adapted to permit removal of an unprocessed substrate from said loadlock and insertion of a processed substrate into said loadlock.

~~43~~ ~~138~~ (new) A loadlock as in claim ~~137~~, wherein said first support structure and said second support structure are movable relative to said cooling plate.

~~44~~ ~~139~~ (new) A loadlock as in claim ~~138~~, wherein said cooling plate is attached to said chamber body.

~~46~~ ~~140~~ (new) A loadlock as in claim ~~136~~, wherein said cooling plate has a plurality of openings extending from a bottom surface of said cooling plate to a top surface of said cooling plate to permit said second support structure to extend therethrough.

~~50~~ ~~141~~ (new) A loadlock as in claim ~~138~~, further comprising a middle plate between said first support structure and said second support structure.

~~46~~ ~~142~~ (new) A loadlock as in claim ~~141~~, wherein said cooling plate includes at least one alignment structure extending therefrom and said middle plate includes at least one opening sized to accommodate said at least one alignment structure extending from said cooling plate.

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C1 ~~47~~ ~~143~~ (new) A loadlock as in claim ~~142~~, wherein said first support structure is connected to said middle plate.

~~48~~ ~~144~~ (new) A loadlock as in claim ~~141~~, wherein said middle plate includes a cooling layer and an insulation layer.

~~50~~ ~~145~~ (new) A loadlock as in claim ~~136~~, wherein said first support structure comprises a plurality of pins and said second support structure comprises a plurality of pins.

~~51~~ ~~146~~ (new) A loadlock as in claim ~~136~~, wherein said first support structure includes outer supports and inner supports, wherein when a substrate is positioned on said first support structure, said outer supports are adapted to contact an outer portion of the substrate and said inner supports are adapted to contact an inner portion of said substrate; and

wherein said second support structure includes outer supports and inner supports, wherein when a substrate is positioned on said second support structure, said outer supports

are adapted to contact an outer portion of the substrate and said inner supports are adapted to contact an inner portion of said substrate

~~52~~ 147. (new) A loadlock as in claim ~~136~~ 41, wherein said elevator is positioned below said cooling plate.

~~53~~ 148. (new) A loadlock as in claim ~~136~~ 41, wherein said cooling plate includes a plurality of openings sized so that said second support structure may extend therethrough without contacting said cooling plate.

~~54~~ 149. (new) A loadlock as in claim ~~136~~ 41, wherein said first and second support structures are sized to accept a glass substrate having a rectangular shape including a length of at least 650 mm and a width of at least 830 mm.

~~55~~ 150. (new) A loadlock as in claim ~~136~~ 41, further comprising a gas inlet adapted to supply a gas to said loadlock, said gas inlet positioned along a top surface of said loadlock.

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cont
~~56~~ 151. (new) A loadlock comprising:
a chamber;
a lower plate having a plurality of supports extending therefrom, said supports adapted to support a single substrate in said chamber;
a cooling plate disposed in said chamber, said cooling plate positioned to accept a single substrate from said support structure, said cooling plate including a plurality of apertures therethrough that are sized to permit said supports to extend therethrough;
said lower plate being positioned below said cooling plate; and
said lower plate and plurality of supports being adapted to move in a vertical direction independent of said cooling plate.

~~57~~ 152. (new) A loadlock as in claim ~~151~~ 56, further comprising a middle plate having a plurality of supports extending therefrom, said supports adapted to support a single substrate, said middle plate positioned above said cooling plate.

~~58~~ 153. (new) A loadlock as in claim ~~57~~ 152, wherein said middle plate and said lower plate are connected to each other and adapted to move together in a vertical direction.

~~59~~ 154. (new) A loadlock as in claim ~~58~~ 153, further comprising an upper plate positioned above said middle plate and coupled to said middle plate and said lower plate so that said upper plate, middle plate and lower plate move together in a vertical direction.

~~60~~ 155. (new) A loadlock as in claim ~~59~~ 154, further comprising a heating element positioned above said middle plate.

~~61~~ 156. (new) A loadlock as in claim ~~56~~ 151, further comprising an elevator connected to said lower plate and adapted to control a vertical position of said lower plate and plurality of supports while at the same time said cooling plate remains in a fixed vertical position.

~~62~~ 157. (new) A loadlock as in claim 156, wherein said elevator is positioned below said lower plate.

~~63~~ 158. (new) A loadlock as in claim ~~56~~ 151, wherein said plurality of supports includes outer supports and inner supports, said inner supports positioned closer to a center region of the lower plate than said outer supports.

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ant ~~64~~ 159. (new) A substrate processing system comprising:
at least one processing chamber;
a transfer chamber connected to said at least one processing chamber; and
a loadlock connected to said transfer chamber, said loadlock comprising:
a chamber body;
a first support structure in said chamber body adapted to support a substrate in direct contact therewith;
a second support structure in said chamber body adapted to support a substrate in direct contact therewith;
a transfer aperture to transfer a substrate between said transfer chamber and said loadlock;
said first support structure being disposed above said second support structure;

an elevator to control a position of said first support structure and said second support structure;

a cooling plate including a surface adapted to support a processed substrate thereon; and

a heating device located above said first support;

wherein said second support structure extends through said cooling plate when said second support structure is positioned to support a substrate.

~~159~~ 160. (new) A substrate processing system as in claim ~~159~~, wherein the at least one processing chamber comprises at least one chamber selected from the group consisting of a physical vapor deposition chamber, a chemical vapor deposition chamber, an etching chamber, and a heating chamber.

~~160~~ 161. (new) A substrate processing system as in claim ~~160~~, further comprising an external substrate supply station including:

a first robot to deliver substrates to said loadlock and pick up substrates from said loadlock;

at least one unprocessed substrate cassette to supply unprocessed substrates to said loadlock; and

at least one processed substrate cassette to accept processed substrates from said loadlock.

~~161~~ 162. (new) A substrate processing system as in claim ~~161~~, further comprising a second robot to transfer a substrate between said loadlock and said transfer chamber.

~~162~~ 163. (new) A substrate processing system as in claim ~~162~~, further comprising a gas supply coupled to said loadlock.

~~163~~ 164. (new) A substrate processing system as in claim ~~163~~, wherein said gas supply comprises helium.

~~164~~ 165. (new) A substrate processing system as in claim ~~164~~, wherein said gas supply comprises helium and nitrogen.

~~72~~ 166. (new) A substrate processing system as in claim ~~71~~ 165, wherein said gas is supplied to said loadlock at a nitrogen partial pressure of 754-759 torr and at a helium partial pressure of 1-6 torr.

~~73~~ 167. (new) A substrate processing system as in claim ~~74~~ 159, wherein said cooling plate includes a plurality of openings extending from a bottom surface thereof to a top surface thereof, said openings being sized to permit said support structures to extend therethrough, said openings including outer openings and inner openings, said outer openings being positioned closer to a peripheral region of said plate than said inner openings.

~~74~~ 168. (new) A substrate processing system comprising:
at least one processing chamber;
a transfer chamber connected to said at least one processing chamber; and
a loadlock connected to said transfer chamber, said loadlock comprising:
an upper support structure adapted to support a single substrate and a
lower support structure adapted to support a single substrate;
an elevator to raise and lower said upper support structure and said lower
support structure;
a cooling plate disposed in said loadlock and positioned to accept a
single substrate from said lower support structure;
a load/unload aperture through which an unprocessed substrate
may be loaded into said loadlock and through which a processed substrate may
be unloaded from said loadlock;
a transfer aperture through which an unprocessed substrate may
be delivered from said loadlock to said transfer chamber and through which a
processed substrate may be delivered from said transfer chamber to said
loadlock;
a heating element disposed above said single substrate upper
support structure; and
a middle plate disposed above said cooling plate and below said
heating element.

~~75~~ 169. (new) A substrate processing system as in claim ~~76~~ 168, wherein said upper support structure is connected to said middle plate.

~~76~~ ~~170~~. (new) A substrate processing system as in claim ~~169~~, further comprising a gas inlet to supply a gas to said loadlock.

~~77~~ ~~171~~. (new) A substrate processing system as in claim ~~170~~, wherein said loadlock includes a top surface, said gas inlet being located along said top surface of said loadlock.

~~78~~ ~~172~~. (new) A substrate processing system as in claim ~~169~~, wherein said upper support structure includes a plurality of supports extending from said middle plate, including inner supports and outer supports, said outer supports being located closer to a periphery of said middle plate than said inner supports.

~~79~~ ~~173~~. (new) A substrate processing system as in claim ~~172~~, further comprising a lower plate to which said lower support structure is connected, said lower plate being positioned below said cooling plate, wherein said lower support structure includes a plurality of supports extending from said lower plate, including inner supports and outer supports, said outer supports being located closer to a periphery of said lower plate than said inner supports, and wherein said cooling plate includes a plurality of openings therein sized to permit said inner supports and said outer supports of said lower support structure to extend therethrough.

~~80~~ ~~174~~. (new) A substrate processing system as in claim ~~79~~, wherein said processing system includes an additional loadlock connected to said transfer chamber.

~~81~~ ~~175~~. (new) A substrate processing system as in claim ~~128~~, wherein said processing system includes an additional loadlock connected to said transfer chamber.

~~82~~ ~~176~~. (new) A substrate processing system as in claim ~~160~~, wherein said processing system includes an additional loadlock connected to said transfer chamber.
